

U.S.S.N. 10/720,628

- 2 -

03-0387 (BOE 0461 PA)

**IN THE CLAIMS:**

1. (currently amended) A method of detecting a shaving created during a hole drilling operation on a substrate of a system, the method comprising:

forming a lubricant having a light emitting substance;

applying said lubricant to a hole-drilling device;

drilling a hole within the substrate using said hole drilling device, wherein the process of drilling said hole creates one or more shavings located on or within said system, wherein a portion of said lubricant adheres to each of said one or more shavings;

illuminating the system with a an object illuminator;

identifying at least one non-fixed object within the system; and

identifying said at least one non-fixed object to be one of said one or more shavings.

2. (original) The method of claim 1 further comprising:

determining whether to remove said one shaving from the system.

3. (original) The method of claim 1 wherein identifying at least one non-fixed object within the system comprises determining at least one object to be a non-fixed object in a system from at least one of an automotive vehicle, a machine, an electronic system, and a mechanical system.

4. (original) The method of claim 1, wherein forming the lubricant comprises:

introducing a first amount of a drilling fluid with a second amount of a light emitting substance to a mixing device, wherein said second amount comprises between

U.S.S.N. 10/720,628

- 3 -

03-0387 (BOE 0461 PA)

about 0.5 and 5 weight percent of the total weight of said first amount and said second amount; and

mixing said first amount and said second amount to a uniform consistency.

5. (original) The method of claim 4, wherein said drilling fluid comprises an oil-based drilling fluid.

6. (original) The method of claim 4, wherein said drilling fluid comprises a water-based drilling fluid.

7. (original) The method of claim 4, wherein said light emitting substance comprises a fluorescent dye.

8. (cancelled)

9. (cancelled)

10. (cancelled)

11. (original) The method of claim 1 further comprising reapplying said lubricant to said drill bit after every five hole drilling operations.

12. (original) The method of claim 1 further comprising:  
drilling at least one more additional hole with said hole drilling device; and  
reapplying said lubricant to said hole-drilling device after drilling said at least one more additional hole.

U.S.S.N. 10/720,628

- 4 -

03-0387 (BOE 0461 PA)

13. (original) A method of detecting a drill bit, or a portion of a drill bit, displaced from a hole drilling device during a hole drilling operation on a substrate of a system, the method comprising:

forming a lubricant having a light emitting substance;

applying said lubricant to the drill bit coupled to the hole-drilling device;

drilling a hole within the substrate using the hole-drilling device, wherein the process of drilling said hole causes the drill bit or the portion of the drill bit to be displaced from the hole-drilling device, wherein a portion of said lubricant adheres to the drill bit or to the portion of the drill bit;

illuminating the system with a object illuminator;

identifying at least one non-fixed object within the system; and

identifying said at least one non-fixed object to be the drill bit or the portion of the drill bit.

14. (original) The method of claim 13 further comprising:

determining whether to remove said the drill bit or portion of the drill bit from the system.

15. (original) The method of claim 13 wherein identifying at least one non-fixed object within the system comprises determining at least one object to be a non-fixed object in a system from at least one of an automotive vehicle, a machine, an electronic system, and a mechanical system.

16. (original) The method of claim 13, wherein forming the lubricant comprises:

introducing a first amount of a drilling fluid with a second amount of a light emitting substance to a mixing device, wherein said second amount comprises between

U.S.S.N. 10/720,628

- 5 -

03-0387 (BOE 0461 PA)

about 0.5 and 5 weight percent of the total weight of said first amount and said second amount; and

mixing said first amount and said second amount to a uniform consistency.

17. (original) The method of claim 16, wherein said drilling fluid comprises an oil-based drilling fluid.

18. (original) The method of claim 16, wherein said drilling fluid comprises a water-based drilling fluid.

19. (original) The method of claim 16, wherein said light emitting substance comprises a fluorescent dye.

20. (cancelled)

21. (cancelled)

22. (cancelled)

23. (original) The method of claim 13 further comprising reapplying said lubricant to the drill bit after every five hole drilling operations.

24. (original) The method of claim 1 further comprising:  
drilling at least one more additional hole with the hole drilling device; and  
reapplying said lubricant to the hole-drilling device after drilling said at least one more additional hole.

U.S.S.N. 10/720,628

- 6 -

03-0387 (BOE 0461 PA)

25. (original) A method for detecting and removing foreign object debris created during hole drilling operations in a system from at least one of an automotive vehicle, a machine, an electronic system, and a mechanical system, the method comprising:

providing a hole drilling device having a drill bit;

forming a light emitting lubricant having a light emitting substance;

introducing said light emitting lubricant to said hole drilling device;

drilling a hole within a substrate with said hole drilling device, wherein the process of drilling said hole creates foreign object debris at least partially coated with said light emitting lubricant, said foreign object debris selected from the group consisting of one or more shavings, one or more portions of said drill bit, and said drill bit;

illuminating the system with an object illuminator;

identifying at least one non-member object within the system; and

identifying said at least one non-member object to be said foreign object debris;

determining whether to remove said foreign object debris; and

removing said foreign object debris.

~~25~~ 26. (currently amended) The method of claim ~~24~~ 25, wherein forming the lubricant comprises:

introducing a first amount of a drilling fluid with a second amount of a light emitting substance to a mixing device, wherein said second amount comprises between about 0.5 and 5 weight percent of the total weight of said first amount and said second amount; and

mixing said first amount and said second amount to a uniform consistency.

U.S.S.N. 10/720,628

- 7 -

03-0387 (BOE 0461 PA)

26 27. (currently amended) The method of claim 25, wherein said drilling fluid comprises an oil-based drilling fluid.

27 28. (currently amended) The method of claim 25, wherein said drilling fluid comprises a water-based drilling fluid.

28 29. (currently amended) The method of claim 25, wherein said light emitting substance comprises a fluorescent dye.

29 30. (cancelled – currently amended) The method of claim 24, wherein said light emitting lubricant comprises Acculube LB-2000 Fluorescent (ALX-06) metalworking lubricant.

30 31. (cancelled – currently amended) The method of claim 28, wherein said fluorescent dye comprises ITW-Dymon-Dykem DYX-163 fluorescent dye.

31 32. (cancelled – currently amended) The method of claim 26, wherein said oil-based drilling fluid comprises Acculube LB-2000 metalworking lubricant.

32 33. (currently amended) The method of claim 24 further comprising reapplying said light emitting lubricant to the drill bit after every five hole drilling operations.

U.S.S.N. 10/720,628

- 8 -

03-0387 (BOE 0461 PA)

~~33~~ 34. (currently amended) The method of claim 24 further comprising:

drilling at least one more additional hole with said hole drilling device; and

reapplying said lubricant to said hole-drilling device after drilling said at least one more additional hole.

34 35. (cancelled – currently amended) A method of forming a light emitting lubricant, the light emitting lubricant added to a hole drilling device during hole drilling operations, wherein the light emitting lubricant is used to detect foreign object debris created during the hole drilling operations, the method comprising:

introducing a first amount of a drilling fluid with a second amount of a light emitting substance to a mixing device, wherein said second amount comprises between about 0.5 and 5 weight percent of the total weight of said first amount and said second amount; and

mixing said first amount and said second amount to a uniform consistency.

~~35~~ 36. (cancelled – currently amended) The method of claim 34, wherein said drilling fluid comprises an oil-based drilling fluid.

~~36~~ 37. (cancelled – currently amended) The method of claim 34, wherein said drilling fluid comprises a water-based drilling fluid.

~~37~~ 38. (cancelled – currently amended) The method of claim 34, wherein said light emitting substance comprises a fluorescent dye.

~~38~~ 39. (cancelled – currently amended) The method of claim 37, wherein said fluorescent dye comprises ITW-Dymon-Dykem DYX-163 fluorescent dye.

U.S.S.N. 10/720,628

- 9 -

03-0387 (BOE 0461 PA)

~~39~~ 40. (cancelled – currently amended) The method of claim 35, wherein said oil-based drilling fluid comprises Acculube LB-2000 metalworking lubricant.